It's a streaming world ...

- Off-shore oil operations

- Smart Cities

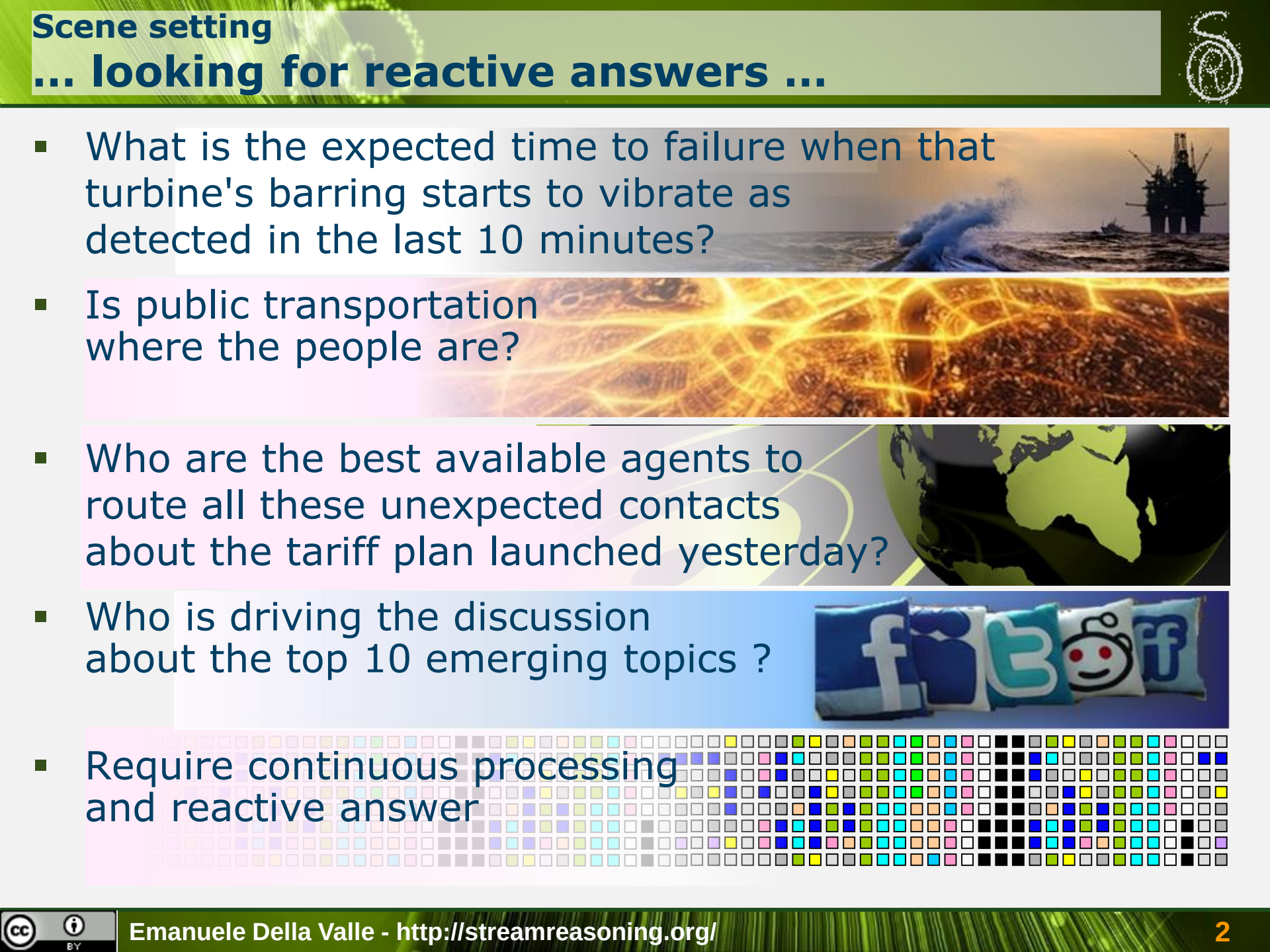
- Global Contact Center

- Social networks

- Generate data streams!

E. Della Valle, S. Ceri, F. van Harmelen, D. Fensel **It's a Streaming World! Reasoning upon Rapidly Changing Information.** IEEE Intelligent Systems 24(6): 83-89 (2009)

… looking for reactive answers …



- What is the expected time to failure when that turbine's barring starts to vibrate as detected in the last 10 minutes?
- Is public transportation where the people are?
- Who are the best available agents to route all these unexpected contacts about the tariff plan launched yesterday?
- Who is driving the discussion about the top 10 emerging topics ?
- Require continuous processing and reactive answer

Requirements 1/8

A system able to answer those queries must be able to

- handle **massive datasets**
  - A typical oil production platform is equipped with about **400.000 sensors**

  - Telecom data is the most pervasive data source in urban are, in Milano there are **1.8 million mobile users**

  - A global contact centre of a Telecom operator counts **500 millions of clients**

  - Facebook alone has **1.1 billion** of active **users**

Requirements 2/8

A system able to answer those queries must be able to

- process **data streams** on the fly
  - The sensors on typical oil production platform generates **10,000** observations per minute with **peaks of 100,000 o/m**

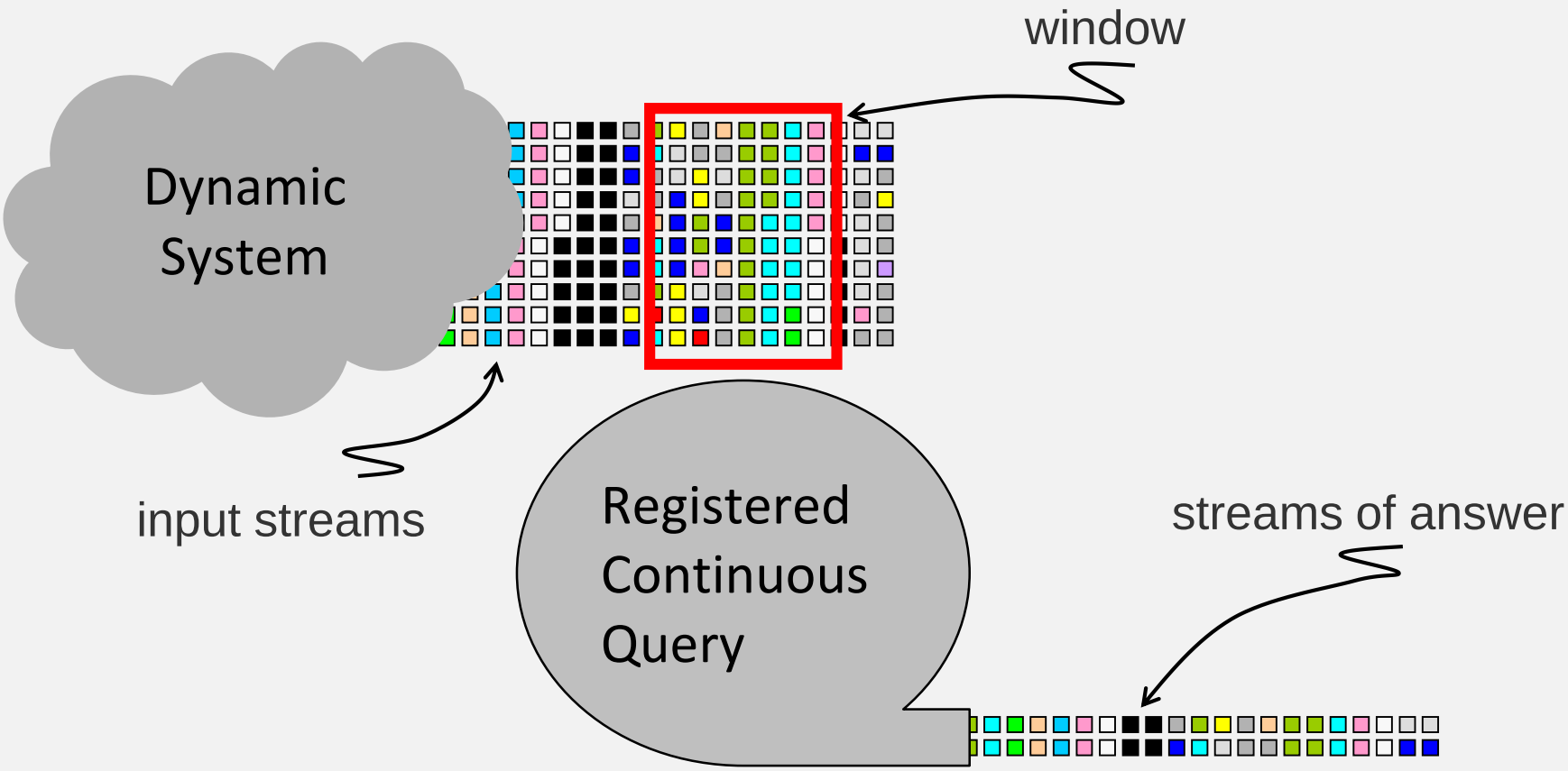
  - The mobile users in Milano generates **20,000** call/sms/data connections per minute with **peaks of 80,000 c/m**

  - A global contact centre receives **10,000** contacts per minute with **peaks of 30,000 c/m**

  - Facebook, as of May 2013, observes **3 millions "I like" per minute**

Streaming Data Analysis

- Continuous queries registered over streams that are observed trough windows



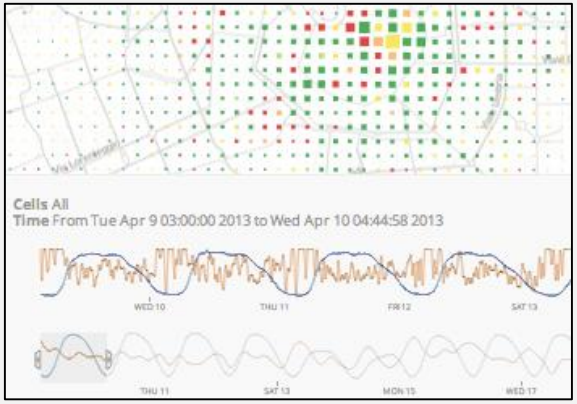
Practical cases

- **10+ deployments** in Sensor Networks, Social media analytics and Cloud Computing, e.g.

BOTTARI

Winner of Semantic Web Challenge 2011

City Data Fusion



Winner of IBM faculty award 2013

EXPO 2015

Fluxedo
#SimplifyYourLife

M. Balduini, I. Celino, D. Dell'Aglio, E. Della Valle, Y. Huang, T. Lee, S.-H. Kim, V. Tresp: BOTTARI: An augmented reality mobile application to deliver personalized and location-based recommendations by continuous analysis of social media streams. J. Web Sem. 16: 33-41 (2012)

M.Balduini, E.Della Valle, M.Azzi, R.Larcher, F.Antonelli, and P.Ciuccarelli: CitySensing: Fusing City Data for Visual Storytelling. IEEE MultiMedia 22(3): 44-53 (2015)